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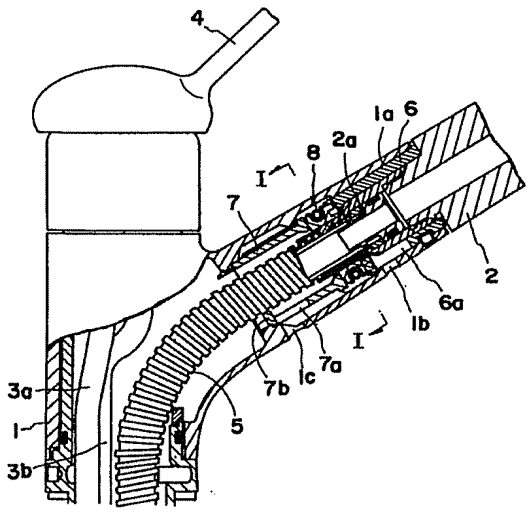
(54) Hose drain mechanism for an extensible shower attachment.

(57) A shower attachment includes a shower head (2), a holder (1a) adapted to hold the shower head so as to allow extraction and retraction of the shower head (2), together with a hose (5) connected thereto, and a hose drain mechanism (8) mounted within the holder (1a). The hose drain mechanism (8) comprises a plurality of blocks (9) radially movable to and from the hose (5) and having sealing portions (9a) on the inner peripheral surfaces, and a resilient element (10) adapted to press the blocks (9) toward the hose (5).

FIG. 1



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The present invention relates generally to an extensible shower attachment wherein a shower head can be extended from the body of a shower and more particularly, to a hose drain mechanism constructed to prevent water from flowing from a shower hose in an extended condition into the shower body.

An extensible shower attachment is used in a kitchen sink or washbasin and includes a faucet body and a shower head mounted to the faucet body, the latter extending from the body to allow the user to wash dishes or hair.

Fig. 11 shows a typical shower attachment mounted in a sink, including a faucet body 1 secured to a counter 50. A shower head 2 is connected to the body 1 as shown in Fig. 11 and can be manually extended from the body 1. A water pipe 3a and a hot water pipe 3b are connected to the body 1. A single lever or handle 4 is mounted to operate a valve incorporated into the body 1. A flexible hose 5 extends between the downstream end of the valve and the shower head 2.

A holder 1a extends obliquely upwardly from the body 1. The shower head 2 is inserted into the holder 1a. Extraction of the shower head 2 from the holder 1a causes the hose 5 to extend from the holder 1a. Replacement of the shower head 2 into the holder 1a causes the hose 5 to move downwardly to a position as shown in Fig. 11.

When the shower head 2 is extended from the body 1, water is likely to flow on and along the hose 5 and enter into the body 1 through the holder 1a. Also, when the shower head 2 is returned to the holder 1a after use, water droplets which are attached on the hose 5 may fall below the counter 50 or into the cabinet.

Conventionally, a drain mechanism is incorporated into the holder 1a to prevent the water droplets on the hose 5 from entering into the body 1 or falling into the cabinet. A bushing as a drain element for removing the water from the surface of the hoses is included in the holder 1a as, for example, disclosed in Japanese unexamined utility model publication No. 62-148674.

A cylindrical bushing or other suitable means is effective to remove water from the surface of the hose 5. Such means is made of resilient material so as to have more contact with the peripheral surface of the hose 5. This enables better drainage of the hose 5.

However, if the hose 5 is quickly returned, the bushing or drain element is resiliently deformed in the direction in which the hose 5 is moved. This deteriorates the attachment of the drain element to the hose 5. As a result, water droplets are not fully removed from the hose 5 and may fall into the cabinet when the hose 6 is returned.

If the hose 5 has a uniform outer diameter and thus, has no rugged surface, the drain element can always be closely contacted with the hose 5. On the other hand, if the hose 5 is in the form of a bellows, the outer diameter of the hose 5 may vary as the hose 5 is bent. The drain element can not follow such resilient deformation of the hose 5.

Such a drain element is unable to fully remove water droplets from the hose by using its resilience. It is therefore necessary to include a water tray or the like in the cabinet.

It is an object of the present invention to provide a hose drain mechanism for an extensible shower attachment which fully prevents water droplets on a hose from falling or water from flowing from a shower head into a faucet or a cabinet.

This invention provides a shower attachment including a shower head, a holder adapted to hold the shower head so as to allow extraction of the shower head together with a hose connected thereto, and a hose drain mechanism mounted within the holder characterized in that said hose drain mechanism comprises a plurality of blocks movable to and from the axis of said hose and having sealing portions on the inner periphery thereof for sealing the outer surface of said hose, and an elastic element adapted to press said blocks toward said hose.

The holder is provided with a cylindrical guide therein which receives the outer periphery of the proximal end portion of the shower head; the guide has a plurality of slide grooves formed in a radial direction at the proximal end surface thereof; the blocks are respectively provided with slide projections at the side end thereof, which movably engage with the slide grooves; and the blocks are movable to and from the axis of the guide along the connection between the slide projections and the slide grooves.

The plurality of blocks can be provided with connecting seat portions at the both ends in the direction in which said blocks follow the circumferential surface of the hose; the connecting seat portions are formed so that each portion is recessed in reverse of the axial direction of the blocks; and the blocks are arranged so that the connecting seat portions of adjacent blocks overlap each other in the axial direction.

A packing may be interposed between the plurality of blocks and the elastic element, and each block is provided with a groove at the outer periphery thereof, which runs in a circumferential direction with the packing mounted into the groove.

The packing may be divided into a plurality of pieces which equal the number of blocks, with each of the divided pieces being arranged so that the boundary end portions of adjacent blocks may be covered.

A coil spring which forms an annular shape corresponding to the blocks is available for the elastic element.

The elastic element provides a mechanical force with its resilience to push the blocks toward the hose. This allows the sealing portions of the blocks to seal the peripheral surface of the hose. The blocks are radially moved in accordance with the rugged surface of the hose so as to maintain a uniform seal between the blocks and the hose. Sealing pressure is maintained by the resilience of the elastic element when the hose is moved. When the hose is roughly moved or shaken, the blocks correspond in motion to the hose to prevent water from flowing across the blocks. Accordingly, the water will not flow below the holder when the hose is extracted from and retracted to the holder.

Because of the connecting structure where each block is slidably mounted to the guide which is accommodated in the holder, each of blocks independently moves corresponding to the rugged surface of the hose, thus allowing a stable and uniform seal along the surface of the hose. When connecting seat portions provided at the both ends of each block overlap with those on adjacent blocks, each block is relatively regulated in axial directed motion and smoothly moves corresponding to the surface of the hose without causing turbulence in the arrangement.

When the blocks move outwardly due to the rugged surface of the hose, the boundary end portions of adjacent blocks will fall into gaps. However, as a packing is provided around the outer periphery of the blocks, the gaps are further covered by the packing to prevent the surface of the hose from being exposed.

Further, as it is sufficient for the packing to seal only the boundary portions of adjacent blocks, the packing may be divided into plural members each of which covers the gaps between adjacent blocks when these blocks move outwardly. Since the divided packing members easily move to correspond with the deformation in the arrangement of the blocks, even though the packing is likely to regulate the circumference of the blocks, it will not interfere with the outward movement of the blocks.

Still further, as the packing is engaged and assembled into the groove on the outer periphery of the block, the packing will not easily dislocate from its original assembled location. This permits smooth and rapid motion of the blocks without any interference or disturbance, and the resistance caused by the tightening of the blocks will be reduced when the hose is extracted for use.

Furthermore, as a circular coil spring is available for a member of the elastic element, the attachment is simplified in structure and also in assembly.

For a better understanding of the present invention, reference may be made to the following detailed description in connection with the accompanying drawings, in which:

Fig. 1 is a sectional side view, partly broken away, of a faucet with a drain mechanism made according to one embodiment of the present invention;

Fig. 2 is a vertical sectional view, on an enlarged scale, showing the principal part of the faucet shown in Fig. 1;

Fig. 3 is a sectional view taken on the line I-I of Fig. 1;

Fig. 4 is a front view showing a combination of blocks and packings;

Fig. 5 is an exploded view showing a block and a first guide;

Fig. 6 is an exploded perspective view of the block and the first guide looking in a different direction;

Fig. 7A is a front view of the block;

Fig. 7B is a right side view of the block;

Fig. 7C is a bottom view of the block;

Fig. 7D is a view of the block looking in the direction of the arrow II-II in Fig. 7A;

Fig. 8 is a front view of the packing;

Fig. 9 is a view showing the manner in which the packing is mounted to the block; and

Fig. 10 is a view of a coil spring as assembled.

Referring now to Fig. 1 to 3, a faucet body 1 is secured, for example, on a kitchen counter, as previously described in connection with Fig. 11. A holder 1a projects from the faucet body 1 to receive an extensible shower head 2. A handle 4 is mounted to the top of the faucet body 1. A valve mechanism is connected to a water pipe 3a and a hot water pipe 3b and is operated by the handle 4 to open and close the passage. A hose 5 is connected to the valve mechanism to feed water or a mixture of cold water and hot water to the shower head 2. A connecter 2a provides a connection between internal passages of the shower head 2 and the hose 5. As shown in Fig. 1, the hose 5 is in the form of a bellows and has a rugged surface. The hose 5 has a thickness that allows it to be bent.

A first guide 6 is mounted within the holder 1a to receive the connecter 2a. Also, a second guide 7 is mounted within the connecter 2a to guide the movable hose 5. The first guide 6 has an inner diameter that allows the base end of the shower head 2 and the connecter 2a to be fit in the first guide 6. The first guide 6 has a discharge opening 6a at its lower end. The second guide 7 is spaced away from the lower end of the first guide 6 and has an inner diameter greater than the diameter of the hose 5. The second guide 7 also has a discharge opening 7a at its lower end. A dam 7b is

formed on the lower end of the inner peripheral surface of the second guide 7 to contact which the peripheral surface of the hose 5. The holder 1a has openings 1b and 1c which correspond in position to the discharge openings 6a and 7a, respectively.

A drain ring 8 is disposed between the first guide 6 and the second guide 7 to remove water from the surface of the hose 5 when the shower head 2 and the hose 5 are returned to their initial positions. As shown in Fig. 3, the drain ring 8 includes four blocks 9, a coil spring 10 as a resilient element, and four packings 11 disposed between the blocks 9 and the coil spring 10.

Fig. 4 is a front view of the drain ring 8 looking proximally from the distal end of the holder 1a. Fig. 5 is an exploded perspective view showing the manner in which the drain ring 8 is connected to the first guide 6. Fig. 6 is an exploded view of the first guide 6 and the blocks 9 from another perspective.

Each block 9 is made of synthetic resin and is arcuate with a central angle of approximately 90° as shown in detail in Fig. 7. As shown in Figs. 2 and 7, each block 9 is tapered to provide a sealing portion 9a. The sealing portion 9a has a triangular section and is in contact with the hose 5 or the connecter 2a. A U-shaped groove 9b is formed in the outer peripheral surface of each block 9 to receive the packing 11 of a U-section. The block 9 is provided with slidable projection 9c extending toward the first guide 6. As shown in Fig. 5, a groove 6b is formed in the end surface of the first guide 6 to receive the slidable projection 9c. The slidable projection 9c is slidable within the groove 6b. The slidable projection 9c and the groove 6c are constructed like a dovetail anchor and a dovetail anchor slot and have a wedge-shaped section. The projection 9c is slidable radially from the blocks 9 assembled in a circular configuration, or radially from the hose 5 or the connecter 2c.

The block 9 is provided with a pair of connecting seat portions 9e, 9f at the both ends in the circumferential direction thereof. These connecting seat portions 9e, 9f are formed so that both ends in the circumferential direction are partially cut away to create a flat portion facing in the axial direction. One connecting seat portion 9e is formed to face upward, and the other connecting seat portion 9f is formed to face downward. When the adjacent blocks 9 are aligned to be joined, the connecting seat portion 9e of one block 9 overlaps the connecting seat portion 9f of one of the adjacent blocks 9, and the connecting seat portion 9f of the same block 9 overlaps the connecting seat portion 9e of another one of the adjacent blocks. In this way, when the blocks 9 are totally assembled, the blocks 9 regulate each other in the axial direction thereof due to the overlapping of the pairs of connecting seat portions 9e, 9f. Therefore, even when each of the blocks 9 moves outwardly and inwardly in a radial direction, the blocks 9 move smoothly and rapidly with the aid of the regulating force caused by the relationship between both of the connecting seat portions.

As shown in Fig. 4, each packing 11 extends over two adjacent blocks 9. A projection 11a extends radially from one end of the packing 11 as shown in Fig. 8. A recess 9d is formed in the outer peripheral surface of the slidable projection 9c to receive the projection 11a. As the slidable projection 9c has a substantially central location in the circumferential direction of the block 9 as shown in Fig. 7A, the end of the packing 11 where the projection 11 is formed is also located centrally in the circumferential direction of the block 9. As shown in Fig. 4, the blocks 9 and the packings 11 are assembled when the projections 11a are fit in the recesses 9d as shown in Fig. 9.

The coil spring 10 extends around the packings 11 to join the blocks 9 and the packings 11 together. Fig. 10 is a plan view of the coil spring 10 in assembly. With the coil spring 10 placed around the blocks 9, the blocks 9 are moved radially outward against the action of the coil spring 10 when outward force is applied to the seal portions 9a of the blocks 9. When the force is removed, allowing the return of the coil spring 10, the blocks 9 are moved back to the original position (Fig. 3). Although a space is formed between adjacent blocks 9 when the blocks 9 are opened, the packings 11 still extend over the adjacent blocks to close the space. The blocks 9 and the packings 11 thus cooperate to seal the hose 5.

Water can be fed from the shower head 2 while the shower head 2 remains attached to the faucet body 1 with the connecter 2a fit into the first guide 6. At this time, the sealing portion 9a of each block 9 is in contact with the peripheral surface of the lower end of the connecter 2a.

When the shower head 2 is extracted, each block 9 is moved to and from the hose 5 in accordance with the step between the connecter 2a and the hose 5 and the rugged surface of the hose 5, while the sealing portions 9a are pressed against the hose 5 by the influence of the coil spring 10. This radial movement of each block 9 promotes smooth extraction of the hose 5.

When the shower head 2 is in use, water tends to gradually flow from the hose 5 into the holder 1a. However, the sealing portions 9a of the blocks 9 of the drain ring 9 are contacted with and forced against the peripheral surface of the hose 5 by the resilience of the coil spring 10. This allows the blocks 9 to prevent the water from entering into the holder 1a. This water is then discharged through the discharge opening 6a of the first guide 6 and

the opening 1b of the holder 1a. Even if the water flows from the hose 5 to the second guide 7 through the blocks 9, the water is stopped by the dam 7b formed on the lower end of the second guide 7. The water is then discharged from the holder 1a through the discharge opening 7a and the opening 1c of the holder 1a.

The drain ring 8 is thus constructed to stop water which flows on and along the hose 5 when the shower head 2 is in use. If the water flows across the blocks 9 and enters into the second guide 7, the dam 7b prevents the water from flowing downstream of the second guide 7. This arrangement assures stoppage of even a large amount of water which is fed from the shower head 2 and flows on and along the hose 5. Thus, a kitchen cabinet or the like is prevented from becoming wet.

When the shower head 2 is returned to the holder 1a, the hose 5 is moved through the drain ring 8 into the faucet body 1. At this time, each block 9 of the drain ring 8 moves in a radial direction in accordance with the rugged surface of the hose 5 so as to bring the sealing portions 9a into contact with the peripheral surface of the hose 5. Thus, if the hose 5 has a rugged surface such as a bellows-shaped pipe, water can be removed from the surface of the hose 5 and discharged through the discharge opening 6a and the opening 1b rather than entering into the faucet body 1. Also, even if water is not completely removed due to rapid movement of the hose 5, the dam 7b of the second guide 7 prevents the water from entering into the faucet body 1, the water being discharged through the discharge opening 7a and the opening 1c.

The four blocks 9 of the drain ring 8 are pressed radially inward by the resilience of the coil spring 10 so as to maintain a uniform sealing pressure between the drain ring 8, the hose 5, and the connecter 2a. This arrangement can remove water from the hose 5 by high sealing pressure, preventing water from entering into the faucet body 1 or kitchen cabinet during rapid movement of the hose 5 more effectively than those systems with resilient means such as a packing.

In the illustrated embodiment, the holder 1a is integrated into the faucet body 1. Alternately, the holder may be directly attached to the kitchen counter above the cabinet. Also, a leaf spring may be used as a resilient element, in lieu of the coil spring 10, to press each block 9 toward the hose 5.

The advantages of the invention are as follows. The resilient element extends around a plurality of blocks, and the sealing portions of the blocks are sealed against the hose by the resilience of the resilient element. Conventionally, a packing as a resilient element is contacted with a hose. In such a case, however, the packing is deformed when the hose is rapidly moved. This results in a decrease in sealing pressure. By contrast, the present invention provides a uniform seal between the hose and the drain ring so as to completely remove water from the hose. Accordingly, if a large amount of water flows on the hose, or the hose is frequently used, the water in no way enters into the cabinet or the like. This eliminates the need for a water tray and like items.

The blocks are radially moved by the resilience of the resilient element. This arrangement provides a seal between the blocks and the hose, even if the hose has a rugged surface such as a bellows-shaped pipe. Thus, the invention has a wide application.

Claims

1. A shower attachment including a shower head, a holder adapted to hold the shower head so as to allow extraction of the shower head together with a hose connected thereto, and a hose drain mechanism mounted within the holder, characterized in that said hose drain mechanism comprises a plurality of blocks movable to and from the axis of said hose and having sealing portions on the inner periphery thereof for sealing the outer surface of said hose, and an elastic element adapted to press said blocks toward said hose.

2. A shower attachment according to claim 1, wherein said holder is provided with a cylindrical guide therein which receives the outer periphery of the proximal end portion of said shower head; said guide has a plurality of slide grooves formed in a radial direction at the proximal end surface thereof; said blocks are respectively provided with slide projections at the side end thereof, which movably engage with said slide grooves; and said blocks are movable to and from the axis of said guide along said connection between said slide projections and slide grooves.

3. A shower attachment according to claim 1 or 2, wherein said plurality of blocks are provided with connecting seat portions at the both ends in the direction in which said blocks follow the circumferential surface of said hose; said connecting seat portions are formed so that each portion is cut away in reverse of the axial direction of said blocks; and the blocks are arranged so that the connecting seat portions of adjacent blocks overlap each other in the axial direction.

4. A shower attachment in accordance with one of claims 1 to 3, wherein a packing is interposed between said plurality of blocks and said elastic element.

5. A shower attachment according to claim 4, wherein each of said plurality of blocks is provided with a groove at the outer periphery thereof in the circumferential direction.

6. A shower attachment according to claim 4 or 5, wherein said packing is divided into a plurality of pieces equaling the number of said blocks, each divided piece being arranged so that the boundary end portions of adjacent blocks may be covered.

7. A shower attachment in accordance with one of claims 1 to 6, wherein said elastic element is a coil spring which forms an annular shape corresponding to said blocks.

FIG. 1

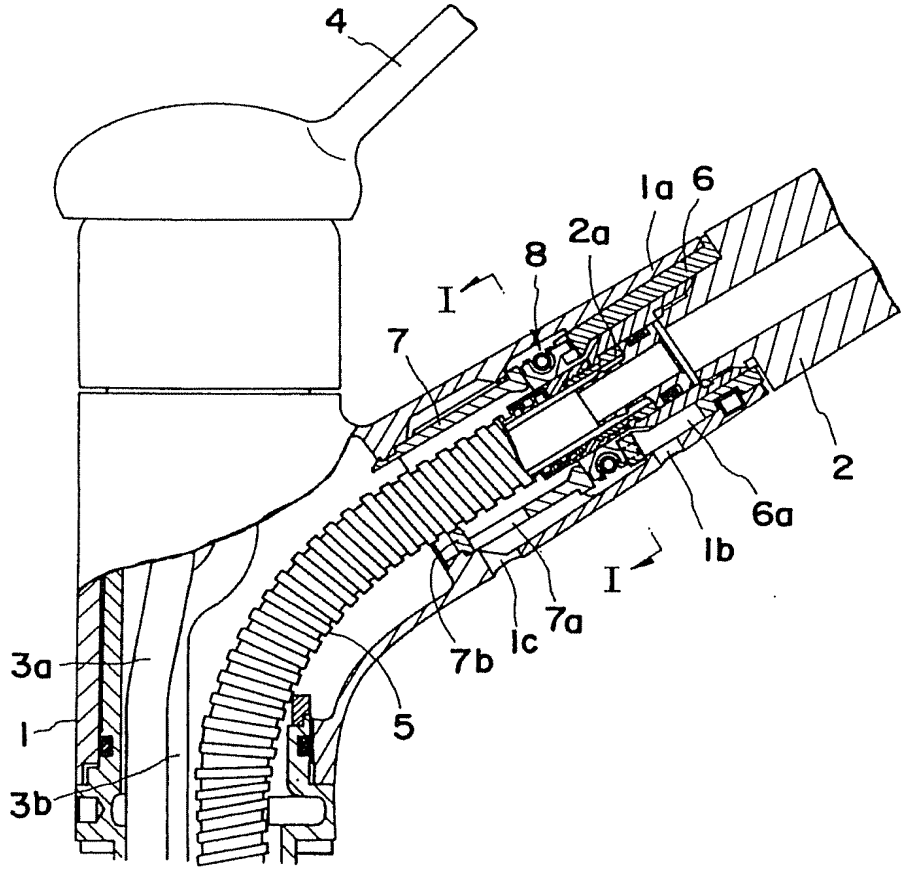


FIG. 2

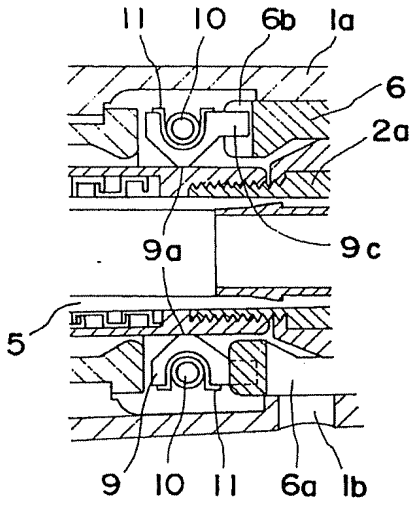


FIG. 3

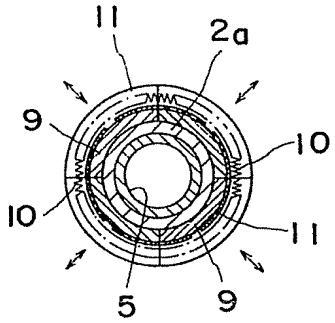


FIG. 4

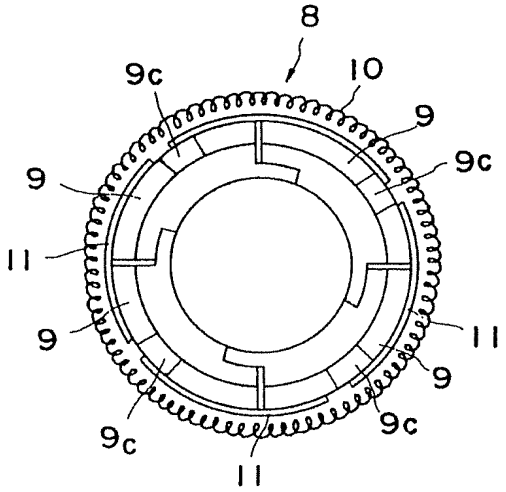


FIG. 5

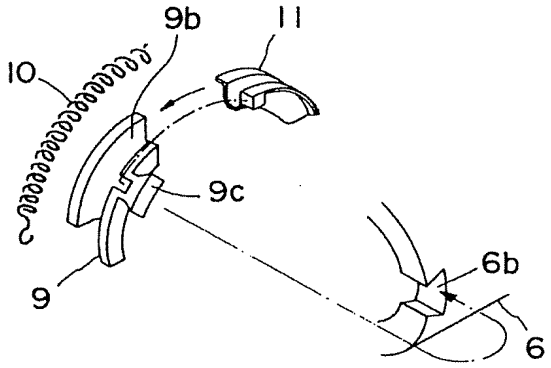


FIG. 6

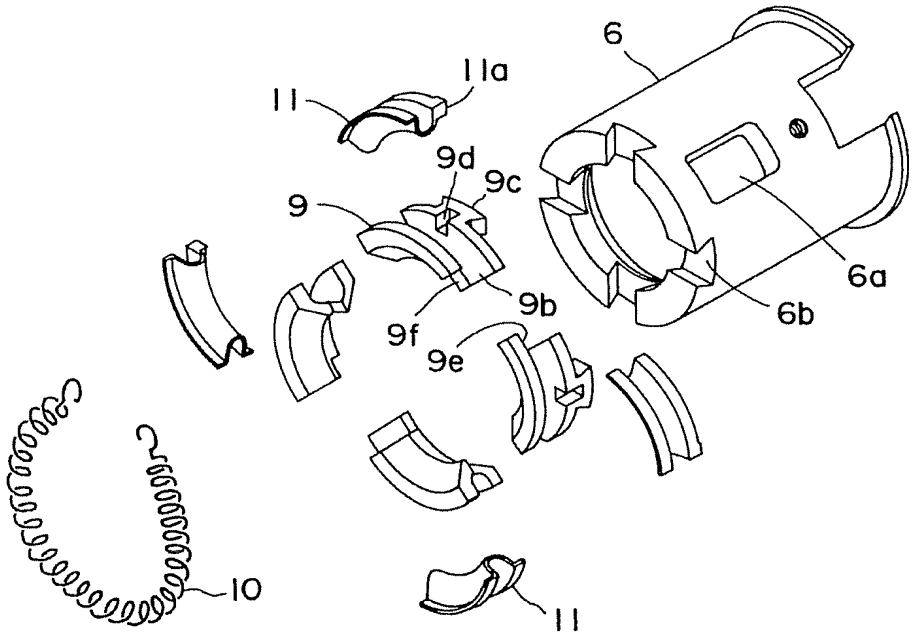

6
11a
11
9d
9c
9
6a
9b
6b
9f
9e
10
11

FIG. 7

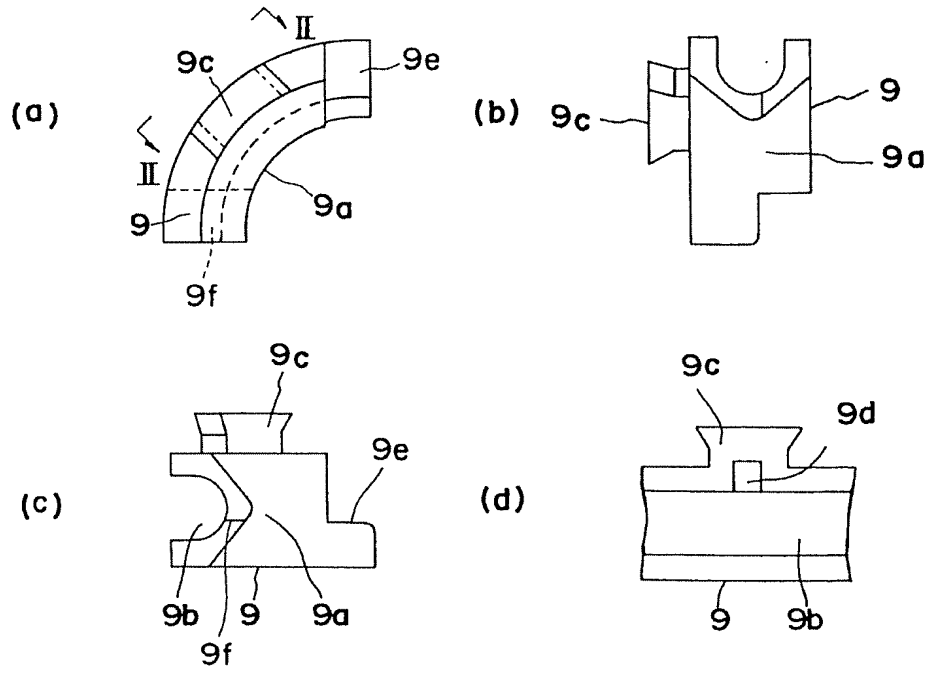

(a)
II
9c
9e
II
9a
9
9f
(b)
9c
9
9a
(c)
9c
9e
9b
9
9a
9f
(d)
9c
9d
9
9b

FIG. 8

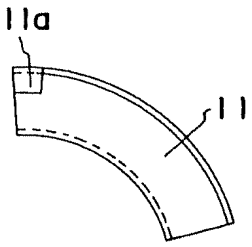


FIG. 9

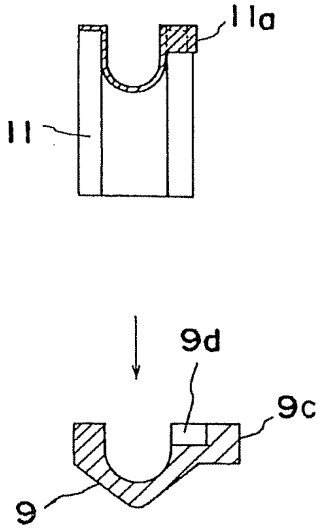


FIG. 10

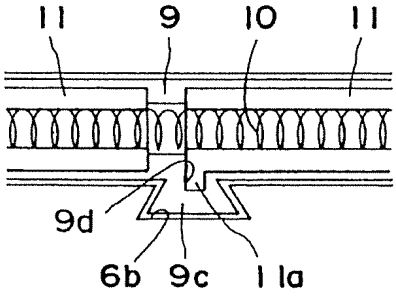
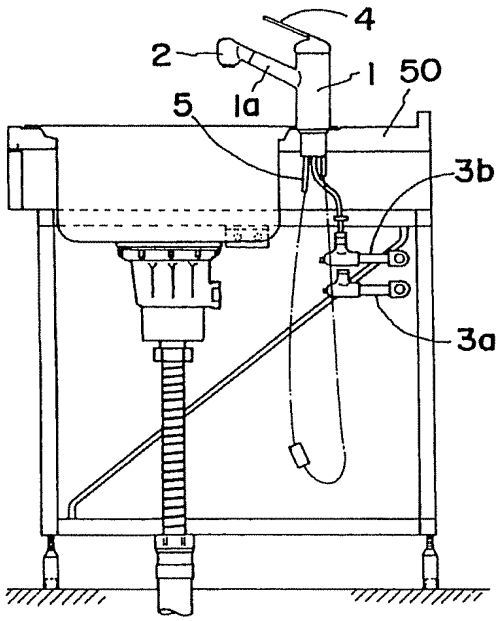


FIG. 11



European Patent Office

EUROPEAN SEARCH REPORT

Application Number

EP 91 11 9376

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
A	DE-U-8 716 239 (KLUDI-ARMATUREN) * page 7, line 18 - page 8; figures * ---	1	E03C1/04 E03C1/06
A	DE-A-3 339 849 (GROHE) * page 7, line 4 - line 22; figures * ---	1,2	
A	DE-U-8 715 230 (WELLA) * page 5, line 4 - line 18; figure 1 * -----	1	

TECHNICAL FIELDS SEARCHED (Int. Cl.5)

E03C

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	12 FEBRUARY 1992	KRIEKOUKIS S.

CATEGORY OF CITED DOCUMENTS

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